

This document: Discussion Notes
 Stakeholder Survey – Poll Results (~17 questions)

Related documents: Meeting Agenda 08-06-2020
 Video recording 8/6/2020 via Microsoft Stream (1 hr 30 min)

DISCUSSION NOTES

TOPIC	DISCUSSION NOTES & COMMENTS
Discussion for overview Poll Questions	<ul style="list-style-type: none"> - Other ways to learn criteria ☑ summary of changes (short-version), emails - Concerns with CWP/RP – water rights, existing retention pond for water rights - UD Spreadsheets – ignore situation; O&M (implementing and developing plans) - **Maintenance Site Plan (Jeremiah Unger) – see CDOT guidance example
Trash Racks	<ul style="list-style-type: none"> - Suppliers – readily available trash racks, well-0screen w/ channel (OSHA) - Other designs (slot-designs/bracketed)
O&M	<ul style="list-style-type: none"> - Can be unclear what maintenance needs are (man power vs. equipment) - Drivable surface examples for maintenance access - Haul road ramp down to trickle channel
Maintenance Crews (Aurora)	<ul style="list-style-type: none"> - Aurora Maintenance Crews – good stakeholders for onsite expertise related to maintenance of EDBs - Surface treatments , rarely an issue with crusher fines, concrete with bike paths, landscaping, width of low flow pans are sometimes too small for walk behind maintenance practices (shovel into heavy equipment) - Equipment access with maintenance manual - Bringing maintenance crews into the design process to understand long-term maintenance needs and feasibility to perform types of maintenance
Micropool	<ul style="list-style-type: none"> - Perceived challenges, concerns with standing water and mosquito hazards - Alternatives in some municipalities
Deviations from criteria	<ul style="list-style-type: none"> - Underdrains - Retrofit options, micropools, forebays, - Example of \$1M maintenance, 6-ft of sediment collected over a decade
**See YouTube instruction videos for UD workbook questions (by DR)	
Open-discussion	EDBs as default BMPs <ul style="list-style-type: none"> - Fall back on what they know; expertise in design. - Flexibility
Proposed change to criteria	Concerns related to groundwater table <ul style="list-style-type: none"> - Check current criteria (some state 2-feet below the basin) - Prefer at least 5-feet above the GWT - Other comments related to variable GWT; some geotechnical analysis is based on one or two dates in the field yet variable GWT can cause problems with infiltration
Muller (Jim/Tracy) – Presentation on EDBs	
Ideas for criteria	<ul style="list-style-type: none"> - Proposed “options” for different EBD components - Build your own EDB example - Planning for EDBs – improving holistic planning effort - Website for feedback and experiences (open new survey)

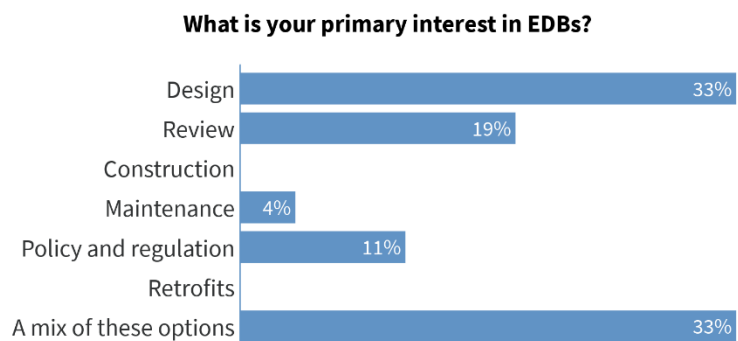
STAKEHOLDER SURVEY – POLL EVERYWHERE RESULTS

Q1: Introduce yourself (Name and organization/place of work)

- Tyler Dell - Colorado Stormwater Center
- Jim Watt, MHFD hello!
- Laddie Fromelius - StormTrap
- Shea Thomas, MHFD
- Clark Wischmeier, Stream LA
- Jeremiah Unger CDOT
- Andrew Earles, Wright Water Engineers
- Derek Rapp -Peak Stormwater Engineering
- Jim Wulliman/Muller
- Sam Miller - City of Aurora
- Tyler Burhenn - Town of Erie
- Brent Kaslon - Valerian
- Jeff Williams, City & County of Denver
- Mark Schutte, MHFD
- Brad Robenstein with Douglas County Public Works Engineering.
- Laura Hinds, MHFD
- Jeff Rice - El Paso County
- Heidi Otten, Kimley-Horn
- Jeremiah Unger
- Colin Bell - Denver Green Infrastructure
- Jesse Clark - Stream Landscape Architecture
- Ryan Taylor, Muller Engineering Company
- Shavger Rekani - Rick Engineering Company
- Will Wilhelm, Kimley-Horn
- Megan Vogt, Civil Engineer with S.A. Miro
- Heather Otterstetter/ City of Westminster
- Jon Villines, MHFD

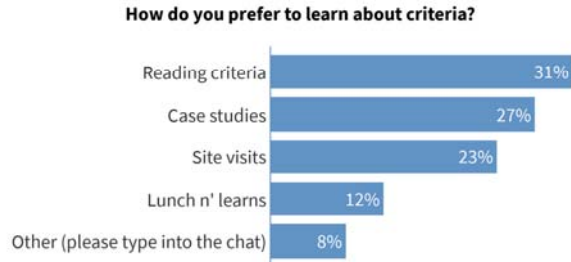
Q2: What is your primary interest in EDBs?

Response	Count
A mix of these options	9
Design	9
Review	5
Policy and regulation	3
Maintenance	1
Total	27



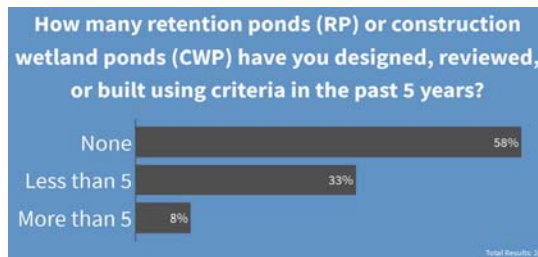
Q3: How do you prefer to learn about criteria?

Response	Count
Reading criteria	8
Case studies	7
Site visits	6
Lunch n' learns	3
Other (please type into the chat)	2
Total	26



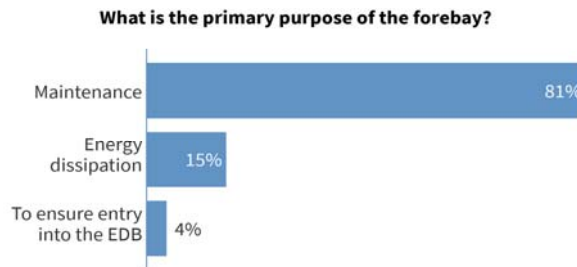
Q4: How many retention ponds (RP) or construction wetland ponds (CWP) have you designed, reviewed, or built using criteria in the past 5 years?

Response	Count
None	14
Less than 5	8
More than 5	2
Total	24



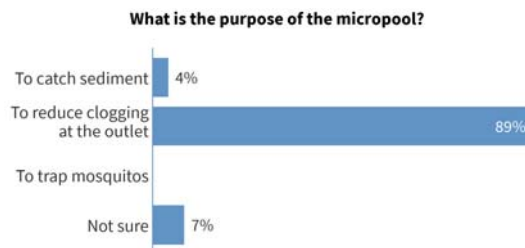
Q5: What is the primary purpose of the forebay?

Response	Count
Maintenance	22
Energy dissipation	4
To ensure entry into the EDB	1
Total	27



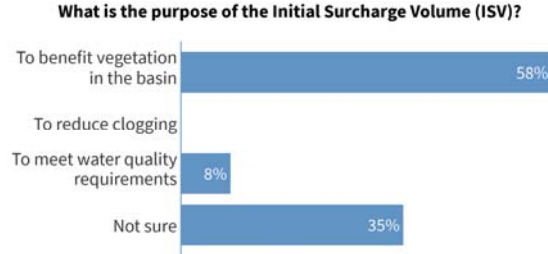
Q6: What is the purpose of the micropool?

Response	Count
To reduce clogging at the outlet	24
Not sure	2
To catch sediment	1
Total	27



Q7: What is the purpose of the Initial Surcharge Volume (ISV)?

Response	Count
To benefit vegetation in the basin	15
Not sure	9
To meet water quality requirements	2
Total	26



Q8: Which component in EDBs do you think people are most confused by?

- Implementing O&M
- Trash racks sizing, when to use (x4)
- Developing O&M
- Emergency overflow – set at the 100-yr or 1’ above?
- Outlet structure (x2)
- Initial Surcharge Volume...Steel channel frame for trash rack and orifice plate installation (x2)
- Maintenance access – where does it actually need to lead to?
- Defining WQCV
- Micropools (x8)
- Purpose of forebay

Q9: Which EDB component is most often constructed incorrectly?

- Maintenance access (x2)
- Orifice plate (x5)
- Well Screen (x4)
- Forebay
- Basin bottom grading (x3)
- Initial Surcharge Volume (x4)
- Micropool (x2)
- Outlet structure and sloped grate
- Vegetation fully re-established (x2)
- Emergency overflow
- Buried riprap

Q10: Where and when have you deviated from EBD criteria? What is the reason for the deviation?

- Have utilized "actual stored volume" (2nd tab of the spreadsheet) vs. the initial calculated volume on the 1st tab. It's unclear if this is advised or allowable.

- Removal of micropool in small EDB's or FSD's in a park area. We integrated multiple levels of trash racks and a well screen to prevent clogging of the outlet structure.
- Remove trickle channel in favor of soft bottom, vegetated channel
- Failing to seal the orifice plate, not realized it was an important component.
- Min. Tributary area, unclear if this is a firm requirement or just a recommendation
- Smaller forebay or conversion of some portion of forebay to allow infiltration
- Unlined, meandering low flow channels
- A lot of deviations from multiple criteria especially in rural areas. Forebays, micropools trickle channels.
- Soft trickle channel
- Freeboard - space constraints
- We have rarely deviated from any of the criteria requirements.
- Slopes
- Grasscrete Forebays - provides infiltration
- Freeboard
- Many local governments are only focused on the WQCV and do not always require forbears or micropools
- Well screens. Allowed deviation to allow for larger holes.
- Soft low flow channel
- Outside MS4
- Trickle channel slope and ISV in areas where we had very little elevation to work with

Q11: What are your recommendations for improving EDB criteria and design (what would you do to make this better)?

- Underground Detention? Not recommended but it is used in practice. Will this be covered in criteria or be avoided intentionally?
- Managing low flows from irrigation return flows with an underdrain or perforated plate adjustment
- Managing irrigation flows - dry weather flows
- Multi-functional uses
- Low flow conveyance/bypass
- Showing a potential underdrain for the pond bottom to completely dry the facility between storms.
- Address the outfall release matching pre-developed conditions where applicable.
- Examples of them being amenities
- Clarify when driving access is needed to components versus close proximity access. Varies with pond size
- Warning against selective implementation of criteria (e.g. WQCV provided but no micropool or forebays). Need to whole package of design elements to be successful
- Rural design recommendations
- Include requirements for topo variation (zones) in the bottom of the pond to avoid the bathtub
- Start with maintenance and work your way backwards. We always talk about initial costs without looking at long term cost

- Enhanced details of individual components of the outlet structure. Maybe a sample plan set for construction drawing development
- Guidance on alternatives to concrete for forebays, trickle channels, etc
- Examples are great. Both photos of success stories and failures, and sample details.
- Examples of design features for various sized ponds.
- Provide examples/case studies for new technologies
- Should be driven by providing the necessary WQ benefit while allowing the designer to have flexibility in design of the BMP
- Guidance in determining when we well designed EDB is the best solution, or when other solutions might be a better choice (site-scale bioretention as an example)
- Bottom stage grading recommendations to avoid flat bottom bathtub
- Require infiltration-based BMP if drain time cannot be achieved with minimum orifice size
- Provide basis behind determination of criteria ranges/minimums/maximums
- Alternatives for Soft trickle/bottom, micropool. And allow more dynamic design to complement context
- Including various shapes of EDBs in the criteria manual, not just the bath tub
- Less prescriptive - make the user go through a thought process to determine the best BMP
- Provide more flexibility with design components

Q12: How can we accommodate maintenance in EDBs with natural flow channels?

- Additional pre-treatment prior to the EDB that reduces sediment and/or trash/debris
- Evaluate conservative sizing to allow for vegetation die off and build up
- Geocells or similar products?
- Excavation level markers, buried hard bottom
- Better understand actual maintenance practices and frequency for site specific conditions
- Replicate natural processes as much as possible - soft bottom/ hybrid forebays
- If the tributary area is large enough, use the HFLM stream design principles to create a self-functioning channel.
- Use and underdrain
- Well-designed forebays
- Upsizing trash racks (well screens) to eliminate algae clogs.
- \$\$
- Consider oversizing forebays,, adding extra volume to basin
- No cobble, sand or turf with an underdrain
- No idea

Q13: What are your concerns with retention ponds (RP)?

- Maintenance (x5)
- Blue green algae and mosquitos
- Odor, algae, aesthetics
- While they work well for pollutant removal after the storm, there is no capacity for WQCV
- Proper design and selection of vegetation depending on depths and frequency of inundation

-
- Smell. Just had a client replace an RP with an EDB for that reason
 - Aeration
 - Shoreline protection
 - Safety
 - Standing water, safety. I have seen many fenced-off RPs, which just aren't aesthetically pleasing
 - Becoming a wetland
 - Sediment removal
 - Stagnation
 - Water quality
 - Compaction of the native base during construction
 - Water rights

Q14: How would you improve criteria for retention ponds (RPs)?

- Provide guidance on true maintenance costs. This may discourage their use
- Steel trap forebay
- Varied edge conditions and plant species, make sure its the right bmp in the first place
- Minimum footprint sizing (i.e. 3% of effective tributary area) to minimize ponding and drawdown timer
- Aeration and movement of water to the extent possible.
- Address concerns raised in prior question
- Require aeration for all but the smallest retention ponds
- Guidance/education to address concerns
- Provide criteria for aeration
- Boat dock

Q15: What are your challenges or concerns with constructed wetland ponds (CWPs)?

- Skipped for time

Q16: How would you improve criteria for constructed wetland ponds (CWPs)?

- Use in place of wetbottom EDB or retention
- Skipped for time

Q17: What issues do you consider when locating an EDB online?

- Balancing wq release times and passing baseflows
- How it can fit into the surrounding environment and support vegetation and it's benefit to water quality
- Potential "overdetention" to account for offsite runoff
- None, not really allowed in the CDOT MS4 permit
- Water quality outlet sizing vs. Flood control volume requirements and whether to pass large events through or capture and detain

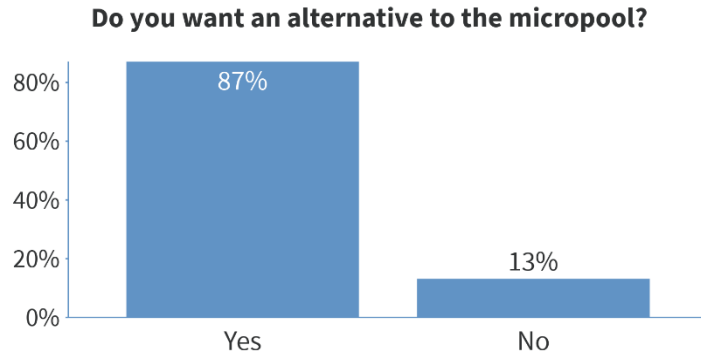
-
- Size of basin; imperviousness; is the stream a water of the state?; base flows; water rights
 - 401/404 permitting
 - Tributary area. We require treatment of the entire tributary area.
 - Multi-functional aspects
 - Sizing for entire upstream basin
 - What magnitude of sediment will enter basin
 - Capacity for WQ and/or EURV
 - Context and site character
 - Site context
 - Size of drainage area, Section 404 permitting
 - Emergency bypass
 - Dealing with base flow

Q18: What are your areas of concern with EDBs?

- Sometimes it seems like they weren't really needed for a site.
- Aesthetics vs a hole in the ground
- Low flows
- Having roadway engineers designing EDBs
- Emergency spillway design - it doesn't have to be at the steepest point.
- How to avoid the bathtub
- Unattractive - hard to meet criteria with more "natural" design and with typical space constraints, while considering maintenance
- Turning into a swamp
- Constructible plans
- EDB is often default BMP selection based on familiarity instead of choosing a more appropriate BMP for the site and hydrologic conditions
- Forebay energy dissipation; access road design; orifice plate attachment and maintenance.
- Bathtub look, flat bottom, ponding water filling bottom due to poor micropool/ISV/outlet design.
- Vegetation biodiversity
- Maintenance, aesthetics
- Proper design of safety grates
- Algae
- Often used in situations where another SCM would be more effective
- Clogged outlets

Q19: Do you want an alternative to the micropool?

Response	Count
Yes	20
No	3
Total	23



AGENDA

MEETING DETAILS

Date/Time: 8/6/2020 - 1:30 PM to 3:00 PM

Location: Via Microsoft Teams (hosted by MHFD)

Topic: USDCM Volume 3 Stakeholder Meeting – Extended Detention Basins, Retention Ponds, Constructed Wetland Ponds

GOALS

- Solicit feedback on criteria for primarily EDBs, as well as, RPs, and CWPs to incorporate into the updated criteria and identify areas where additional education/outreach may be needed.

MEETING OUTLINE

- | | | | |
|---|--|--------|--------|
| 1 | INTRODUCTIONS | MHFD | 5 min |
| | - Mile High Flood District | | |
| | - Muller Engineering | | |
| 2 | STAKEHOLDER SURVEY & DISCUSSION | All | 60 min |
| | - Where do you deviate from Extended Detention Basin criteria when you do? | | |
| | - What are your areas of concerns with Extended Detention Basins? | | |
| | - What areas of the criteria should be improved? | | |
| 3 | FEEDBACK & NEXT STEPS | Muller | 10 min |
| 4 | ANNOUNCEMENTS | MHFD | 5 min |
| | - Webpage (coming soon) | | |
| | - Additional feedback or requests to Morgan Lynch at MHFD (mlynch@mhfd.org) | | |
| 5 | ADJOURNMENT | | |